

Request for Reconsideration:

Applicants are amending claim 1 to include the limitations of claim 2 and to clarify the description of the invention. Applicants also are cancelling claim 2, without prejudice. No new matter is added by the foregoing amendments, and these amendments are fully supported by the specification. E.g., Appl'n, Page 7, Lines 18-23; Page 9, Lines 20-25; **Figs. 9 and 12.** Applicants respectfully request that the Examiner enter the foregoing amendments and that the Examiner reconsider the above-captioned patent application in view of the foregoing amendments and the following remarks, as well as the accompanying Supplemental Information Disclosure Statement.

Remarks:

1. Rejections.

Claims 1-6 stand rejected under 35 U.S.C. § 103(a), as allegedly rendered obvious by Patent No. US 6,685,362 B2 to Burkholder et al. ("Burkholder") in view of Japanese Patent No. JP 2002/243978 ("JP'978"), and claim 7 stands rejected under 35 U.S.C. § 103(a), as allegedly rendered obvious by Burkholder in view of JP'978, as applied to claim 1, and further in view of Patent No. US 6,352,375 B1 to Shimoji et al. ("Shimoji"). The Office Action has made these rejections **final**. Applicants respectfully traverse.

2. Obviousness Rejections.

As noted above, claims 1-6 stand rejected as allegedly rendered obvious by Burkholder in view of JP'978 and claim 7 as allegedly rendered obvious by Burkholder in view of JP'978, as applied to claim 1, and further in view of Shimoji. In order for the Office Action to establish a prima facie case of obviousness, at least three criteria must be met. First, there must be some suggestion or motivation, either in the combined references or in the knowledge generally available to one of ordinary skill in the art, to combine the cited references in the manner proposed by the Office Action. Second, the prior art references must disclose or suggest all the claim limitations. Third, there must be a reasonable expectation of success. MPEP 2143. For the reasons set forth below, Applicants respectfully traverse these obviousness rejections.

Burkholder describes leaf springs (or other urging means), which are separate and independent from a shutter. These leaf springs are not forming integrally with the shutter, and increase the number of parts in the connector and the connector's complexity of assembly. Burkholder, Column 4, Lines 38-64. Moreover, although Burkholder's connector includes

shutters (13, 14) and leaf springs (15, 51), leaf springs mover along contacting points or a contacting path on shutters (13, 14) as leaf springs (15, 51) move towards the pivoting portions of shutters as shutters (13, 14) open or part. Burkholder, **Figs. 1b, 2a-c, and 5**. This occurs because the end portions of leaf spring (15, 51) are not fixed to a surface of shutters (13, 14), respectively. Burkholder, Column 4, Lines 60-64. Therefore, elastic force of the shutter given by the leaf spring varies depending on the deflection (or degree of opening) of shutters (13, 14), but leaf springs (15, 51) do not exert a constant elastic force. Compare Appl'n, Page 9, Lines 24-25. In addition, in order to fabricate Burkholder's "elastic members" and double doors within a housing, it may be necessary to increase the size of the housing. Thus, Burkholder's connector may become larger and more complex in comparison to Applicants' claimed connector.

Referring to Applicants' **Figs. 9 and 12**, shutter plate 77 comprises an opening portion 103 formed therethrough. Elastic portion 79 is disposed within opening portion 103. Appl'n, Page 7, Lines 21-22. Shutter plate 77 has one end formed integrally with elastic portion 79 and another end formed as support portion 111 fitted to upper or lower face 109 of housing 75. As described in the specification, claimed invention has advantages that optical connector 73 does not deform shutter plate 77 in blocking component 81. Appl'n, Page 9, Lines 20-25. Elastic portion 79 comprises base 139 adjacent to the end of shutter plate 77 and its forward end disposed adjacent to a coupling face. Therefore, during deformation of elastic portion 79, elastic portion 79 experiences a substantially constant resilience even in optical connectors for multiple cores.¹

The Office Action contends that JP'978 "disclose[s] an adapter (1) having a shielding member (5) with an opening in which an elastic portion (5a) is disposed." Office Action, Page 2, Line 24, and Page 3, Line 1. Applicants respectfully disagree. Contrary to the Office Action's assertion, JP'978's element 5a is not an elastic portion for urging a shielding member 5 into the orifice of adapter 1. Instead, element 5a is configured to engage the plug frame 23 of the inserted optical connector 2. JP'978, Para [0025] (computer translation available from the Japanese Patent Office; copy enclosed). Thus, Applicants maintain that the Office Action fails to demonstrate that JP'978 discloses an elastic portion, as described in Applicants'

¹ Referring again to the specification (page 10, lines 4-22), the claimed invention provides for an optical connector including a blocking component suitable for multiple cores, without a change in the insertion force of a plug of another optical connector.

amended claim 1, disposed in an opening portion formed in a shutter, such as Applicants' shutter 77.

With regard to the amended claim 1, the shutter plate comprises an opening portion formed therethrough, in which the elastic portion is disposed. The elastic portion is disposed at a side of the pivot shaft, and on an opposite side of the elastic portion for applying a force to the shutter plate is disposed in the position blocking the optical axis. The elastic portion has one end formed integral with the opening portion and another end formed to be a support portion fitted to an upper or bottom face of the housing. Thus, because each and every element of the claimed invention is neither disclosed nor suggested by Burkholder in view of JP'978, amended claim 1 describes a structure distinguishable over Burkholder in view of JP'978.² Therefore, Applicants respectfully request that the Examiner withdraw the obviousness rejections to claim 1 and 3-7

Conclusion:

Applicants respectfully submit that this application, as amended, is in condition for allowance, and such disposition is earnestly solicited. If the Examiner believes that an interview with Applicants' representatives, either in person or by telephone, would expedite prosecution of this application, Applicants would welcome such an opportunity. Applicants believes that no fees are due as a result of the amendments to the pending claims. Nevertheless, in the event of any variance between the fees determined by Applicants and the fees determined

² The Office action does not contend that Shimoji discloses or suggests the elements of Applicants' claimed invention that are missing from Burkholder in view of JP'978.

by the U.S. Patent and Trademark Office, please charge or credit such variance to the undersigned's Deposit Account No. 02-0375.

Respectfully submitted,

BAKER BOTTS L.L.P.

By: 

James B. Arpin

Registration No. 33,470

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Baker Botts L.L.P.
The Warner, Suite 1300
1299 Pennsylvania Avenue, N.W.
Washington, D.C. 20004-2400
(202) 639-7700 (telephone)
(202) 639-7890 (facsimile)

JBA/dw

Enclosures

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]**[0001]**

[Field of the Invention] This invention relates to the covered member used for the optical connector connection adapter and it which were constituted so that the optical axis passing through the inside of an optical connector connection adapter might be covered in more detail about the covered member used for an optical connector connection adapter and it.

[0002]

[Description of the Prior Art] Generally in optical communication, an optical fiber is used as a cable for transmitting a laser beam, and the edge is equipped with the optical connector. And transfer of a laser beam is performed by fitting into the optical connector connection adapter connected to the light source with which communication equipment etc. was equipped in this optical connector, and making an optical axis in agreement. Moreover, also in order to connect optical fibers, the optical connector connection adapter is used.

[0003] In order to interrupt a laser beam as shown in JP,8-43618,A, the publication number No. 211264 [nine to], JP,11-352357,A, JP,2000-347075,A, etc. so that an operator's eyes may not be conventionally put accidentally during connection of an optical connector or a pulling-out activity at a laser beam for example, the proposal which forms a shutter is made.

[Problem(s) to be Solved by the Invention]

[0004] The optical connector which equipped the interior of an optical connector with the shutter for interrupting a laser beam so that a direct laser beam might not go into an operator's eyes is shown in JP,8-43618,A and a publication-number No. 211264 [nine to] official report. However, in the optical connector shown in these, since the tooth space for each opening an optical axis further in addition to the fitting length of the usual optical connector, and missing a shutter is also needed, only the part has the problem that the configuration and dimension of an optical connector become large.

[0005] Moreover, in the optical connector with a shutter shown in JP,11-352357,A, the shutter which is interlocked with a motion of the moving part which moves according to a motion of housing, and opens and closes the optical outgoing radiation section is formed, and it is constituted. However, the device for opening and closing a shutter is complicated, and there is a problem that there are many components mark for constituting the device. Moreover, cost will also become high while manufacture will take time and effort so much, if there are many components mark. Furthermore, fear of generating of the wear powder accompanying attachment and detachment of an optical connector is also considered.

[0006] Furthermore, in the connector adapter shown in JP,2000-347075,A, although a shutter retreats from the optical path of a laser beam according to pushing migration of a plug, a shutter jumps out of a connector adapter in that case. Therefore, there is a possibility that dust may enter the interior of a connector adapter from opening for a shutter to jump out.

[0007] Moreover, when an optical connector and a connector adapter without the shutter already used were changed into the above things with a shutter, it had to exchange for an optical connector and a connector adapter with a shutter, and there was a problem that the optical connector without a shutter and connector adapter which have already been attached became useless. In addition, conventionally, since the dimension configuration is large compared with elegance, the above-mentioned optical connector and the above-mentioned connector adapter with a shutter may be simply unexchangeable.

[0008] By the way, as for direct this slack and the part concerned, a laser beam may generate heat in response to the exposure of a laser beam. There is a possibility of becoming remarkable high temperature in the case of high

power (more than 1W [for example,]), and being in a dangerous condition especially. Moreover, a possibility that the laser beam by which outgoing radiation was carried out may reflect in a shutter, and data may not be again transmitted correctly in the outgoing radiation section arises.

[0009] Then, this invention aims at offering the optical connector connection adapter which prepared the covered member which covers the optical axis of the laser beam which can be replaced as it is in the existing use part, without changing the existing optical connector connection adapter and existing dimension to which the device which interrupts the optical axis of a laser beam is not attached. Moreover, this invention aims at offering the optical connector connection adapter which can detect the condition at a glance, even when heat should not concentrate on a part and it should become high temperature. Furthermore, it is hard to generate the friction powder by pulling out of a connector, and aims at offering the optical connector connection adapter [structure is easy and] which can also press down cost. Moreover, this invention offers the covered member used for the optical connector connection adapter which it takes simply and can be stuck also to the existing optical connector connection adapter to which the covered member which interrupts the optical axis of a laser beam is not attached.

[0010]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem invention according to claim 1 In the optical connector connection adapter detachably connected with an optical connector an optical connector connection adapter The fitting section which holds an optical connector and fits in is equipped with the covered member which covers the optical axis passing through the inside of this optical connector connection adapter. A covered member When it is formed of the sheet metal-like member which has elasticity and an optical connector is fitted in, while being located so that it may be pushed down by the path of insertion in connection with the motion and may be inserted between the wall of this optical connector connection adapter, and the external surface of said optical connector and opening an optical axis When an optical connector is pulled out, it is characterized by being constituted so that it may return to the location which rises with the elasticity of this covered member and covers an optical axis again.

[0011] In order to solve the above-mentioned technical problem, invention according to claim 2 is characterized by forming the covered member so that the ferrule of an optical connector may not be contacted in an optical connector connection adapter according to claim 1.

[0012] In order to solve the above-mentioned technical problem, invention according to claim 3 is characterized by forming the covered member so that the near front face where a laser beam hits may carry out scattered reflection of this laser beam in an optical connector connection adapter according to claim 1 or 2.

[0013] In order to solve the above-mentioned technical problem, in an optical connector connection adapter given in any 1 of claims 1-3, as for invention according to claim 4, the near front face where the plug of an optical connector is inserted at least is characterized by carrying out resin coating, as for a covered member.

[0014] In order to solve the above-mentioned technical problem, invention according to claim 5 is characterized by equipping the optical connector connection adapter with a means to detect the temperature rise by the exposure of a laser beam in an optical connector connection adapter given in any 1 term of claims 1-4.

[0015] In the optical connector connection adapter by which invention according to claim 6 is detachably connected with an optical connector in order to solve the above-mentioned technical problem, an optical connector connection adapter is characterized by to have a means detect the temperature rise of this optical connector connection adapter by the exposure of a laser beam while it equips the fitting section which holds an optical connector and fits in with the covered member which covers the optical axis passing through the inside of this optical connector connection adapter.

[0016] In order to solve the above-mentioned technical problem, in the covered member which uses invention according to claim 7 for an optical connector connection adapter given in any 1 term of claims 1-6, a covered member is characterized by making attachment possible free [attachment and detachment] at the optical connector connection adapter.

[0017]

[Embodiment of the Invention] The covered member used for the optical connector connection adapter and it concerning this invention is explained to a detail using a drawing. The perspective view in 1 operation gestalt of the optical connector connection adapter which drawing 1 requires for this invention, the flat-surface part sectional view of the optical connector connection adapter which showed drawing 2 (a) to drawing 1 $R > 1$, and drawing 2 (b) are the side elevation.

[0018] First, the light source of a laser beam is connected to one side, and the optical connector connecting plug 1 shown in drawing 1 is connected with the optical connector 2 of the push pull mold corresponding to another side. This optical connector 2 is the thing of the existing type currently used from the former, and is roughly constituted by the slide cap 21, the plug frame 23, and the ferrule 25.

[0019] The plug frame 23 is contained making the ferrule 25 of the cross-section round shape connected to the fiber optic cable 30 project from the edge of the opposite side while being formed with synthetic resin and receiving a fiber optic cable 30 from the end section side. And as the outside of the plug frame 23 is covered, the slide cap 21 is attached, and the slide is made possible at the longitudinal direction. In addition, the range which can be slid when the verge-of-opening section prepared in the both-sides side of the slide cap 21 contacts 1st contact section 27a and 2nd contact section 27b which were prepared in the both-sides side of the plug frame 23 is restricted. Moreover, between 1st contact section 27a and 2nd contact section 27b, while the engagement section 27 for engaging with the sleeve 11 of the optical connector connecting plug 1 mentioned later is formed, the piece 29 of guidance inserted in the guide rail 17 of the optical connector connecting plug 1 is formed in the up front face of the slide cap 21.

[0020] On the other hand, roughly, the light source of a laser beam is connected to an end section side, and the optical connector connecting plug 1 has the adapter housing 10 equipped with the two fitting sections 19 and 19 for receiving an optical connector 2 in an other end side. In addition, another optical connector 2 can also be connected instead of the light source of a laser beam. Inside the adapter housing 10, it has the sleeve 11 which engages with the engagement section 27 formed in the both-sides side of the plug frame 23 of an optical connector 2, and the split sleeve 13 which is made to counter with the ferrule of another optical connector (not shown) by which accepts a ferrule 25 and fitting is carried out to the light source or the opposite side, and makes an optical axis associate. The configuration of the optical connector connecting plug 1 makes one unit counter, and is manufactured by welding and unifying, and the configuration on either side serves as symmetry.

[0021] a split sleeve 13 -- the optical connector connecting plug 1 -- it is mostly located in pars intermedia, and the interior has the shape of a cylindrical shape of a cavity, and is formed. And sleeves 11 and 11 are arranged beside [both] the split sleeve 13. The point of the side in which the optical connector 2 of a sleeve 11 is inserted is formed in the shape of a hook so that it may engage with the engagement section 27 of the plug frame 23. The guide rails 17 and 17 deeply cut to the neighborhood in which the tip of a split sleeve 13 is mostly located from the fitting sections 19 and 19 are formed in the up front face of the adapter housing 10, and the piece 29 of guidance set up by the up front face of the slide cap 21 is accepted.

[0022] The metal plate metallic ornaments 15 are attached in the side face of one side of the adapter housing 10. The plate metallic ornaments 15 are pressed by elasticity in the direction of a side face of the adapter housing 10 while they have the protruding piece which projects in the direction of an outside. This structure is attached in equipment or the position of a device. Attachment crevice 15a for attaching the plate metallic ornaments 15 is formed in the side face of the adapter housing 10.

[0023] The shutter 5 which is the covered member which covers the optical axis passing through the interior is attached in the fitting section 19 of the opposite side by the side in which the plate metallic ornaments 15 were attached between the two fitting sections 19 and 19 of the adapter housing 10. A shutter 5 is formed of the metal member of the shape of sheet metal which has elasticity, as shown in drawing 3 . In connection with a motion of the optical connector 2 inserted by own elasticity from the fitting section 19, it is pushed down by the path of insertion, is folded up, and is made and bent. While it is located so that it may be inserted between the wall of the adapter housing 10, and the external surface of the slide cap 21, and opening the optical axis of a laser beam. When an optical connector 2 is pulled out, it is constituted so that it may return to the location which rises with the elasticity of a shutter 5 and covers the optical axis of a laser beam again and the leakage of the laser beam from the fitting section 19 may be prevented.

[0024] As metal sheet metal, such as copper whose thickness is about 0.01-0.10mm or its alloy, and stainless steel, is bent, covered section 5b is formed, and the shutter 5 has fixed the shutter 5 on the base of the adapter housing 10. Where fitting of the optical connector 2 is carried out, since the thickness is very thin, a shutter 5 is contained so that it may be inserted between the wall of the adapter housing 10, and the external surface of the slide cap 21. In this case, it is also possible to form the stowage which deletes the wall section of the adapter housing 10 slightly, and misses a shutter 5. In addition, since the thickness of a shutter 5 is thin, it is possible to form a stowage, without changing the configuration and size of the conventional adapter housing 10.

[0025] As it projects in an optical connector 2 insertion side, heights 5a is prepared in the front face of the

shutter 5 in this operation gestalt. Heights 5a is formed so that the plug frame 23 lower-limit section of the inserted optical connector 2 may be contacted and the front face of a shutter 5 and the ferrule 25 of an optical connector 2 may not contact directly. As shown in drawing 3, heights 5a may cut deeply and form the front face of a shutter 5, and as shown in drawing 4, it can also form it by printing. That is, the shutter 5 shown in drawing 4 has flection 5e by which a part of middle of covered section 5b was bent, and is formed while heights 5a in contact with the plug frame 23 lower-limit section protrudes on three places (refer to drawing 4 (a)) (refer to drawing 4 (b)). A ferrule 25 contacts direct electric shielding section 5b according to this structure (refer to drawing 10). Of course, it is possible to also make a shutter 5 open and close, without preparing heights 5a as shown in drawing 5.

[0026] Since there is a possibility that the part irradiated when the laser beam of high power concentrated and the shutter 5 irradiated may serve as high temperature, it is desirable to use copper with heat dissipation nature high [as a metal used for a shutter 5] thermal conductivity and sufficient or its alloy. Moreover, it is desirable to have moderate elasticity and to use the metal with high resistance to the metal fatigue. if it irradiates by the laser beam of high power, for example, the output beyond 1W, -- the case of the shutter 5 (board thickness: about 0.05mm) made from a copper alloy (beryllium copper) -- the temperature of a shutter 5 -- Centigrade -- about 140 degrees -- reaching -- the adapter housing 10 (product made of PBT resin) made of resin -- Centigrade -- it amounts to about 90 degrees. moreover -- the case where it is made about 0.03mm of board thickness although it became the almost same temperature also when the quality of the material of a shutter was made into stainless steel material (board thickness: about 0.05mm) -- the temperature of a shutter 5 -- Centigrade -- the temperature of about 120 degrees and the adapter housing 10 -- Centigrade -- it amounts also to about 100 degrees. Thus, in order that an operator may make connection of an optical connector in the condition of being an elevated temperature, it is very dangerous to touch the optical connector connecting plug 1 (the adapter housing 10 and shutter 5). Therefore, it has a detection means to detect the temperature rise by the exposure of a laser beam.

[0027] Coating of the resin which changes a color as a detection means to detect a temperature rise in the case of an elevated temperature which exceeds the case of Centigrade 20 - 30 degrees (ordinary temperature) and 60-degree Centigrade in this operation gestalt to the peripheral surface of covered section 5b of a shutter 5 and/or the adapter housing 10, a coating, the plating, etc. is carried out. In addition, of course, the setting region of discoloration temperature is not restricted to this, and may be set to 50-degree Centigrade or 70-degree Centigrade. Thus, by using for the peripheral surface of covered section 5b of a shutter 5, and/or the adapter housing 10 the ingredient which changes a color with temperature, since the temperature is known in an instant if the color of covered section 5b or the adapter housing 10 is seen, an operator becomes possible [working safely]. In this case, in order to make it the present condition known about coatings, such as resin, a coating, and plating, the ingredient whose discoloration by temperature is heat-reversibility can also be used, and if it will be in a heating condition once and discolors in order to enable a check of the fact that the laser beam was irradiated by the shutter 5 at least, an irreversible ingredient with which that color does not return can also be used. Of course, a detection means cannot be restricted to this, you may form using the material which discolors covered section 5b of a shutter 5, and the adapter housing 10 with temperature, and the seal discolored with temperature can also be stuck. It is also possible to form a temperature sensor furthermore.

[0028] Proper approaches, such as boss crushing joining besides the approach of fixing with the means of field welding, adhesives, etc. as shown in drawing 5 as a mounting arrangement to the adapter housing 10 of a shutter 5 to base 10b of the adapter housing 10 or inside 10c of the adapter housing 10, a caulking stop, and press fit, are employable. Here, it is an example of boss crushing joining which was shown in drawing 6. Namely, lobe 10a prepared so that it might project more slightly than the thickness of a shutter 5 in base 10b of the near adapter housing 10 with which four pores 5d and 5d drilled by a part of shutter 5 are inserted in an optical connector 2, It inserted in 10a (refer to drawing 6 (a)), and the shutter 5 has fixed by carrying out heat welding of the lobes 10a and 10a which projected from Pores 5d and 5d (refer to drawing 6 (b)).

[0029] Although a shutter 5 fixes again in the direct adapter housing 10 which the **** carried out, it can also be formed in the conventional optical connector connecting plug 1 in which others and a shutter are not formed possible [attachment] free [attachment and detachment]. Namely, having been shown in drawing 7 as a mounting arrangement of other shutters 5 attaches a shutter 5 in the frame 7 (refer to 7 (a)) with abduction formed so that the peripheral face by the side of the edge of the adapter housing 10 might be covered from an outside, and it performs it by pressing this attachment frame 7 fit in the edge of the adapter housing 10 (refer to

drawing 7 (b)). In addition, the attachment frame 7 can also be formed so that it may attach in the inside of the adapter housing 10.

[0030] Furthermore, a shutter 5 can also be formed as a member as shown in drawing 8. The shutter 5 shown in drawing 8 is formed with metal sheet metal, such as copper whose thickness is about 0.01-0.10mm or its alloy, and stainless steel, has bond part 5c which carries out snap association in covered section 5b which covers an optical axis, and attachment crevice 15a which attaches the plate metallic ornaments 15, and is formed in it. Since the adapter housing 10 is formed in bilateral symmetry, it uses attachment crevice 15a in which the plate metallic ornaments 15 are not attached. In addition, association to the adapter housing 10 of a shutter 5 is not restricted to this, and a proper approach is adopted.

[0031] Moreover, the near front face where the laser beam of a shutter 5 hits is coarse, for example, it is processed in the shape of crepe, and scattered reflection of the laser beam by which outgoing radiation was carried out is carried out. It is prevented that the laser beam which hit the shutter 5 by this reflects as it is, and returns to an outgoing radiation side.

[0032] Furthermore, resin coating is performed in order that a shutter 5 may press down friction which the near (the side which faces a laser beam is the opposite side) front face where an optical connector 2 is inserted produces by contact on the plug frame 23. Since this does not contact the metal part of a shutter 5, and directly, generating of the metal powder accompanying attachment and detachment of an optical connector 2 is prevented. Here, as for the resin which changes a color with temperature, a coating, plating, etc., giving on this resin coating is desirable. In addition, although old explanation has been given using the optical connector of single fiber, of course, it is applicable not only to this but the optical connector of multicore.

[0033] Next, actuation of the optical connector connection adapter concerning this invention is explained using drawing 9. It is a side-face sectional view a part, and (a) shows the condition in front of fitting, (b) shows the condition in fitting and drawing 9 shows the condition for which the fitting condition to the optical connector connecting plug 1 of an optical connector 2 is shown that fitting completed (c).

[0034] First, after checking whether the color of the adapter housing 10 or a shutter 5, i.e., a thermometry display, is checked, and there is any risk in an activity, an optical connector 2 is inserted in the fitting section 19 attached in the shutter 5 of the optical connector connecting plug 1 (drawing 9 (a)). If an optical connector 2 is inserted in the fitting section 19, the lower limit section of the plug frame 23 will contact heights 5a of a shutter 5. If an optical connector 2 is furthermore inserted to the back, a shutter 5 will be pushed down by the path of insertion in connection with a motion of an optical connector 2 with own elasticity (drawing 9 (b)). And while the engagement section 27 of an optical connector 2 engages with the point of a sleeve 11, a ferrule 25 is introduced in a split sleeve 13, and fitting is completed. At this time, a shutter 5 is located so that it may be inserted between the wall of the adapter housing 10, and the external surface of the slide cap 21, and it opens the optical axis of a laser beam.

[0035] On the other hand, if a motion contrary to above-mentioned actuation is performed and it completes pulling out in pulling out an optical connector 2, a shutter 5 will return to the location which rises with own elasticity and covers the optical axis of a laser beam again, and will prevent the leakage of the laser beam from the fitting section 19 (drawing 9 (c)).

[0036]

[Effect of the Invention] As explained until now, while being able to prevent that a laser beam is directly put to an operator's eyes according to the optical connector connection adapter concerning this invention, since it is not necessary to change the dimension of the existing optical connector connection adapter to which the device which interrupts the optical axis of a laser beam is not attached, it is effective in the ability to transpose to the existing use part as it is. Moreover, since structure is easy compared with the conventional thing, it is realizable by low cost.

[0037] Moreover, according to this invention, since the condition can be checked even if heat should not concentrate on a part of covered member and it should suit a heating condition, it is effective in safety being very high. Moreover, since it is hard to generate the friction powder of the metal by pulling out of a connector, it is effective in the dependability of communication link grace being high.

[0038] Furthermore, according to the covered member used for the optical connector connection adapter concerning this invention, it is effective in the ability to attach easily also to the existing optical connector connection adapter to which a covered member is not attached.

[Translation done.]